DOCUMENT RESUME

ED 153 836 SE 024 133

TITLE Iowa Supplement...For Commercial Applicators. IC-427.
INSTITUTION Iowa State Univ. of Science and Technology, Ames. Cooperative Extension Service.
PUB DATE Jan 76
NOTE 32p.; For related documents, see SE 023 740, SE 024 060-061 and SE 024 120-132

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Certification; *Environment; Equipment Maintenance; Legislation; *Pesticides; Safety
IDENTIFIERS Iowa; *Pests

ABSTRACT

This manual provides information needed to meet specific standards for certification as a pesticide applicator. The text outlines the procedures to be followed for certification. Additionally, a general overview of important data such as toxicity of pesticides, poison control centers, record keeping, equipment maintenance and liability is provided. Sample questions from a certification examination are provided for self-study. (CS)

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IOWA SUPPLEMENT

. . .for commercial applicators

The enclosed pages are supplements to the USDA-EPA manual, *Apply Pesticides Correctly—A guide for commercial applicators.* They should be placed in the manual and studied, along with the other material in the manual, before taking a certification examination.

SE 024 133

Cooperative Extension Service, ISU, supplement to USDA-EPA mannual **Apply Pesticides Correctly— A guide for commercial appl'cators.**

Cooperative Extension Service
IOWA STATE UNIVERSITY
Ames, Iowa 50011

IC-427
January 1976

Procedures to Be Followed to Obtain an Iowa Pesticide Applicator's License and for Commercial and Public Pesticide Applicators to Become Certified

Companies engaged in the business of applying pesticides to the lands or properties of another are required to be licensed by the Iowa Department of Agriculture. A company may be a person who is sole owner and operator.

The individuals who are responsible for the operation of spray equipment and are not under the direct supervision of a certified applicator are required to be certified.

How to Obtain an Iowa Pesticide Applicator's License

New applicants (companies) are to request pesticide applicator license forms (see pp. vi, viii) from the Pesticide Section of Iowa Department of Agriculture, State Capitol, Des Moines, Iowa 50319.

Upon receipt of the forms, complete fully, giving the name under which the business operates, mailing address, business telephone number and, if incorporated, a list of the corporate officers. If the business is a partnership, list each partner's name.

List each individual to be certified on the form for Listing of Certified Pesticide Applicators (see p. viii). An owner-operator must list himself/herself. Other companies should list each individual responsible for applying pesticides who is employed by the company. In addition, show the classifications of pesticide application each individual will be doing. The description of the classifications is shown on the reverse side of the form.

Application to renew a pesticide applicator's license will automatically be sent to each pesticide applicator licensed the previous calendar year (see p. vii.) This is handled by computer and will be sent to you like an annual billing. However, the company applying for renewal must complete the form for listing of certified pesticide applicators each year as well.

Fees. Whether applicants use the new form or the renewal form to apply for a pesticide applicator's license, they should attach a check made out to the Iowa Department of Agriculture in the amount of $25.00 to cover the annual pesticide applicator license fee.

Public pesticide applicators are exempted from payment of the annual license fee.

Proof of financial responsibility. In addition to buying an annual license, an applicant for a pesticide applicator's license must file with the Department of Agriculture proof of financial responsibility either in the form of a certificate of liability insurance or a surety bond. The minimum amount of liability coverage acceptable is $50,000.00 each for property damage and public liability insurance, including loss for damage arising out of the actual use of any pesticide (chemical coverage). The proof of financial responsibility may be submitted with the application for a pesticide applicator's license or requested from your insuring or bonding company who in turn would supply the Department of Agriculture with a certificate of insurance or surety bond.

Nonresident pesticide applicators. Any nonresident (person or company) applying for a pesticide applicator's license in this state shall file a *written power-of-attorney* designating the *Secretary of State* as the agent of the nonresident upon whom service of process may be had in the event of any suit against said nonresident person. The written power-of-attorney must be filed with the Secretary of State prior to issuance of the pesticide application license to the nonresident.

The *Iowa Pesticide Act* requires that at least one *individual* from a company *take and pass a written certification examination* before the Secretary of Agriculture issues a pesticide applicator's license.

How to Become Certified as Competent to Apply Pesticides.

According to the Iowa Pesticide Act, a commercial pesticide applicator and a public pesticide applicator shall pass an examination demonstrating competence in applying pesticides before receiving a pesticide applicator certification card and a pesticide applicator's license is issued to the company.

The Iowa Department of Agriculture uses written examinations to qualify an individual pesticide applicator for certification.

Each individual pesticide applicator not under the direct supervision of a certified applicator must take and pass the written examination to demonstrate competence to apply pesticides. The written examination(s) taken will correspond to each classification as shown on the application for a pesticide applicator's license.

Each individual commercial pesticide applicator and public pesticide applicator will pay a $10 certification fee for each time certified. The applicator may take more than one written examination over different certification classifications

without having to pay additional certification fees.

The Iowa Department of Agriculture requires recertification of each individual pesticide applicator every third year.

To prepare for taking the written examinations, the manual, *Apply Pesticides Correctly— A guide for commercial applicators* (plus an Iowa State University supplement) and the appropriate category manual(s) should be studied. These manuals can be obtained from county extension offices or from Publications Distribution, Iowa State University, Ames, Iowa 50011. When ordering a category manual from Publications Distribution, the specific category number (see p. ix) must be specified.

Written examination(s) may be taken on any day, Monday through Friday, that state offices are open, preferably before 3:00 p.m. No prior appointment is needed. The location of the Pesticide Section of Iowa Department of Agriculture is East 7th & Court Avenue, Des Moines, Iowa 50319.

Written examinations will also be given in the outlying areas of the state each year. Pesticide applicators should keep in touch with their local county extension offices for specific dates and places.

STATE OF IOWA

DEPARTMENT OF AGRICULTURE

Date _____ R.H. Lounsberry, Secretary For the Year _____

APPLICATION FOR A PESTICIDE APPLICATOR'S LICENSE

_____

(Name under which applicant is engaged in business) (License No.)

_____

(Street) (City) (State) (Zip No.)

_____

(Principle place of business) (Telephone No.)

Check One Corporation ( ) Partnership ( ) Governmental ( ) Individual ( )

Names of Officers or Partners	Mailing Address
_____	_____
_____	_____
_____	_____

The following named person is designated as agent to appear and act for and on behalf of the applicant in matters relating to the pesticide application business.

_____

(Name) (Mailing Address) (Telephone No.)

The above named company **is not** in the business of applying pesticides to the lands or properties of another but has employees who apply restricted use pesticide to company property and are required to be certified in compliance with federal regulations.

Signed _____ Title _____

Licensing of Pesticide Applicators (Commercial or Public Applicator).

1. No person (company) shall **engage in the business** of applying pesticides on the lands or property of another at any time without being licensed by the Secretary.
2. The Secretary shall require an annual license fee of not more than **$25.00** for each license.
3. The Secretary **shall not issue** a commercial applicator's license as required, **until the applicant has furnished evidence of financial responsibility**—consisting either of a **surety bond** or a **liability insurance** policy or certification.
4. The Secretary **shall not issue** a pesticide applicators license until the individual engaged in or managing the pesticide application business is certified as competent by passing an examination to demonstrate to the Secretary his knowledge of how to apply pesticides.
5. Any **nonresident** applying for a pesticide applicators license to operate in this State **shall file a written power-of-attorney** designating the Secretary of State as his duly authorized agent upon whom service of process maybe had in the event of any suit against the nonresident person.
6. The annual license fee is not required of public applicators who have applied for pesticide applicators license or companies that apply restricted use pesticide to company property.

THIS FORM IS AN OFFICIAL RECORD FOR IDENTIFYING COMPANY PERSONNEL AND RESPONSIBILITY.

Cooperative Extension Service, ISU, supplement to USDA-EPA manual **Apply Pesticides Correctly—A guide for commercial applicators.**

CP-C3147 9/75

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STATE OF IOWA
DEPARTMENT OF AGRICULTURE
R. H. LOUNSBERRY, SECRETARY

Date _____ For Year _____

LISTING OF CERTIFIED PESTICIDE APPLICATORS

Employed by _____
(company or business name) (license number)

_____
(Street) (City) (State) (Zip No.)

_____
(Telephone number)

List each certified and to be certified applicator in company's employ.

Name of Employee	**Show each individual's classification(s) (by number)**

SEE CLASSIFICATION DESCRIPTION ON REVERSE SIDE

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CLASSIFICATION OF APPLICATORS

Each individual maybe certified according to the classification in which he has demonstrated his competence. The description of the classifications is as follows:

1. AGRICULTURAL PEST CONTROL
   - 1A. AGRICULTURAL WEED CONTROL.
     This subcategory includes commercial applicators and certified commercial applicators using or supervising the use of herbicides for crop pest control in the production of agricultural crops.
   - 1B. AGRICULTURAL INSECT CONTROL.
     This subcategory includes commercial applicators and certified commercial applicators using or supervising the use of insecticides for crop pest control in the production of agricultural crops.
   - 1C. AGRICULTURAL FUNGUS CONTROL.
     This subcategory includes commercial applicators and certified commercial applicators using or supervising the use of fungicides for crop disease control in the production of agricultural crops.
   - 1D. FRUIT AND VEGETABLE PEST CONTROL.
     This subcategory includes commercial applicators, public applicators, certified commercial applicators using or supervising the use of pesticides to control pests in the production of fruits and vegetables.
   - 1E. ANIMAL PEST CONTROL.
     This subcategory includes commercial applicators and certified commercial applicators using or supervising the use of pesticides on animals and to places on or inwhich animals are confined.
2. FOREST PEST CONTROL.
   This category includes commercial applicators and certified commercial applicators using or supervising the use of pesticide in forests, forest nurseries and forest seed production area.
3. ORNAMENTAL AND TURF PEST CONTROL.
   This category includes commercial applicators, public applicators, certified commercial applicators using or supervising the use of pesticides to control pests in the maintenance and production of ornamental trees, shrubs, flowers and turf.
4. SEED TREATMENT.
   This category includes commercial applicators and certified commercial applicators using or supervising the use of pesticides on seeds.
5. AQUATIC PEST CONTROL.
   This category includes commercial applicators and certified commercial applicators using or supervising the use of pesticides purposefully applied to standing or running water, excluding applicators engaged in public health related activities.
6. RIGHT-OF-WAY PEST CONTROL.
   This category includes commercial applicator, public applicators and certified commercial applicators using or supervising the use of pesticides in the maintenance of public roads, electric power lines, pipelines, railroad rights-of-way, industrial weed control or other similar areas.
7. INDUSTRIAL, INSTITUTIONAL, STRUCTURAL AND HEALTH RELATED PEST CONTROL:
   - 7A. GENERAL AND HOUSEHOLD PEST CONTROL.
     This subcategory includes commercial applicators using or supervising the use of pesticides for general and household pest control in human dwellings, institutions, food dispensing and handling establishments, excluding food manufacturers and processers.
   - 7B. TERMITE CONTROL.
     This subcategory includes commercial applicators, public applicators and certified commercial applicators using or supervising the use of pesticides for structural pest control.
   - 7C. FOOD INDUSTRY PEST CONTROL.
     This subcategory includes commercial applicators, public applicators and certified commercial applicators using or supervising the use of pesticides in on or around areas where grain is stored and where food is processed or manufactured.
   - 7D. COMMUNITY INSECT CONTROL.
     This subcategory includes commercial applicators and certified commercial applicators using or supervising the use of pesticides for the control of flies and mosquitoes in community health programs.
8. PUBLIC HEALTH PEST CONTROL.
   This category includes public applicators using or supervising the use of pesticides in public health programs for the management and control of insects, disease, rodents and birds having medical and public health importance.
9. REGULATORY PEST CONTROL.
   This category includes state, federal or other governmental employees who use or supervise the use of restricted use pesticides in the control of pests as a part of their regulatory responsibilities.
10. DEMONSTRATION AND RESEARCH PEST CONTROL.
    This category includes individuals who demonstrate to the public the proper use and techniques of application or researches the use of pesticides and in doing so use or supervise the use of restricted use pesticides.
11. AERIAL APPLICATORS.
    This category includes commercial aerial applicators and certified commercial aerial applicators using or supervising the use of pesticides for the control of pests through the use of aerial equipment.

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Pest Management

Pest Management is a modern philosophy of pest control based on the use of a variety of control methods to keep pests below economically harmful levels with a minimum harmful impact to the environment. Basically, economic-injury levels and integrated control practices serve as foundations on which all pest management programs are built. Economic-injury level refers to the lowest number of pests present that will cause economic damage or loss; economic threshold refers to the number of pests present when control action is taken to prevent numbers from reaching the economic-injury level. Integrated control refers to using two or more control methods to control a given pest.

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Toxicity of Pesticides

Types of Pesticide Toxicity

Toxicity means "how poisonous." In other words, if you know the toxicity of a pesticide, you know how poisonous it is. The toxicity of a pesticide must be measured in more than one way. Many pesticides are dangerous after one large dose. Some pesticides, however, are dangerous after small, repeated doses.

Acute toxicity is how poisonous a pesticide is to an animal (or man) after a single exposure. A pesticide with a high acute toxicity is deadly if even a very small amount is absorbed. Usually how poisonous one pesticide is compared to another is judged on acute toxicity. It is also the basis for the warning statements on the label. Acute toxicity may be measured as acute **oral** toxicity, acute **dermal** toxicity, and acute **inhalation** toxicity.

Chronic toxicity is how poisonous a pesticide is to an animal (or man) after small, repeated doses over a period of time. You can be poisoned without ever getting a large dose of pesticide. Chronic toxicity is measured as chronic **oral** toxicity, chronic **dermal** toxicity, and chronic **inhalation** toxicity. Chronic toxicity is very important because some pesticides can remain in the body for a long time. If you are exposed often to these pesticides, they may remain in your body and build up.

Measuring Pesticide Toxicity

Finding out the toxicity of pesticides to humans is not easy. Obviously humans cannot be test animals. Other animals, usually rats, are used. However, just because a pesticide is very poisonous to rats doesn't necessarily mean it is also very poisonous to dogs, cows, man or wildlife. Likewise, a pesticide which is relatively nontoxic to rats is not always safe to other animals. Toxicity studies are only guidelines. They are used to estimate how poisonous a pesticide is compared to another pesticide.

Acute toxicity measures. LD_{50} is a standard toxicological term that literally means single lethal dose (deadly amount) for 50 percent of a population of test animals, usually rats, mice or rabbits. LD_{50} values are measured from 0 up and are given as a single oral dose, a single dermal dose, or both. The lower the LD_{50} value, the more toxic the pesticide. Most LD_{50} values are given on a basis of milligrams of pesticide per kilogram of body weight of test animal. However, most people cannot readily relate to the metric units of weight, milligram and kilogram, and LD_{50} values based on ounces of pesticide per 100 pounds of test animal would be more meaningful. Therefore, in order to convert LD_{50} values given in milligrams per kilogram to values given in ounces per 100 pounds, the value given in milligrams per kilogram should be divided by 625.

For example, malathion has an oral LD_{50} of 1375. This means that if 1375 milligrams of technical or concentrate malathion per kilogram of body weight of test animal were fed to each animal of a test population, approximately 50 percent of the animals would be killed as a result. Then, dividing the 1375 figure given in milligrams per kilogram by 625 results in an LD_{50} value in ounces per 100 pounds; $1375 \div 625 = 2.2$. Therefore, the *probable* lethal oral dose of technical malathion for a 200-pound man would be 2 times 2.2 or 4.4 ounces. The word "probable" is stressed because toxicological data obtained from specific animal studies do not necessarily apply to man or other species of animals.

Acute inhalation toxicity is measured by LC_{50}. LC means "lethal concentration." "Concentration" is used instead of "dose" because the amount of pesticide inhaled from air is being measured. LC_{50} values are measured in milligrams per liter. Liters are metric units of volume similar to a quart. The *lower* the LC_{50} value, the *more poisonous* the pesticide.

Chronic toxicity measures. There is no standard measure like LD_{50} for chronic toxicity studies. Often, the length of the experiment in days, months, or years and the amount of each dose is stated. For example, a study of chronic oral toxicity might look like this: 8 milligrams of pesticide were fed to rats daily for two years. No symptoms of poisoning appeared.

The chronic toxicity of organo-phosphate and carbamate pesticides is measured by cholinesterase levels in the blood. A low level of cholinesterase means danger. If an individual's cholinesterase level is abnormally low, that person should stay away from organophosphates and carbamates until the level is normal again.

Pesticide Hazard

Pesticide hazard is the risk that danger or harm will come to the applicator, bystanders, consumers, livestock, wildlife, or crops, etc. from the use of a pesticide. Hazard is often confused with toxicity. A highly toxic pesticide is usually considered "hazardous" because of the high risk that the applicator, bystanders, etc. can be injured. However, safe and careful handling of a highly toxic pesticide can make it a low risk or low hazard. Things to consider are: host, the total amount involved, the formulation chosen, the concentration and dosage used, the type of pesticide and the skill of the applicator.

Host. A pesticide is hazardous if it is used on a plant or animal host which can be easily injured by it. If a pesticide does not injure plants, there is a low hazard when using the chemical on or around them. However, that same chemical could be highly toxic to animals. If used on or around animals, there is a bigger risk than when used on or around plants. The pesticide is hazardous to animals, but not hazardous to plants. A pesticide applicator should choose the pesticide which is *least* hazardous to the host being treated.

Formulation. Moderately poisonous pesticide formulations which are easily absorbed or inhaled may be very hazardous. Sometimes highly toxic pesticide formulations which are not easily absorbed or inhaled are fairly nonhazardous. Generally, the most hazardous form of any pesticide is in the emulsifiable concentrate formulation.

Concentration and dosage. A highly toxic pesticide which is very dilute can be fairly nonhazardous. A moderately toxic pesticide which is very concentrated can be more hazardous. Using a gallon per acre of a slightly toxic pesticide can be more hazardous than a pint per acre of moderately toxic pesticide.

Type of pesticide. Some moderately poisonous pesticides are hazardous to the environment because they accumulate in animals. Dieldrin and other chlorinated hydrocarbons for example are known to accumulate in animals. Some of these long-lasting pesticides are relatively safe, however, when used inside buildings or homes. Other pesticides, including many organophosphates, are highly toxic but break down quickly in the environment. These are not as hazardous to the environment but can be very hazardous in buildings or around people.

Applicator. Skilled, experienced applicators using a highly toxic material may be less of a hazard to themselves and others than homeowners who spread relatively nontoxic ant and roach bait around their houses. Pesticide applicators should have the skill and knowledge to handle all pesticides safely. Otherwise, they are a hazard to themselves, others and the environment.

Warnings and Precautions

To be effective, pesticides must kill or reduce the numbers of the target pest. By their nature, pesticides must be toxic to some degree. A pesticide applicator can tell the relative toxicity of a product by reading the signal words, symbols and environmental warnings on the label.

Signal words. One of the most important parts of the label is the *signal word.* It tells you how toxic the material is. Signal words are used to tell the user whether the chemical is highly toxic, moderately toxic, of low toxicity or relatively nontoxic. Label signal words are based on acute toxicity. Acute oral toxicity, acute dermal toxicity and acute inhalation toxicity are all used to determine the correct toxicity category for each pesticide. For example, if the acute oral toxicity and acute dermal toxicity of a pesticide are in the low toxicity category, but the actute inhalation toxicity is in the highly toxic category, the pesticide label will have the signal words for a *highly toxic* pesticide.

The signal words that follow are set by law and each manufacturer must use the correct one on every label:

Toxicity category	Signal word required on the label	LD_{50} Oral (milligram/kilogram)	LD_{50} Dermal (milligram/kilogram)	LD_{50} Inhalation milligram/liter	Probable oral lethal dose for 150-lb. man
Highly toxic	DANGER skull and crossbones	0-50	0-200	0-2,000	A taste to a teaspoonful
Moderately toxic	WARNING	over 50 to 500	over 200 to 2,000	over 2,000 to 20,000	A teaspoonful to two (2) tablespoonfuls
Low toxicity	CAUTION	over 500 to 5,000	over 2,000 to 20,000	----	An ounce to a pint
Relatively nontoxic	No signal word required	over 5,000	over 20,000	----	Over one pint

All products must bear the statement "Keep Out of Reach of Children."

Symbols. One of the best ways to catch a person's eye is with pictures or symbols. This is why a skull-and-crossbones symbol is used on all highly toxic materials along with the signal word DANGER.

In addition, some product labels use other symbols to warn people against drinking, spilling or breathing in the toxic material. Strict attention should be paid to symbols on the pesticide label. They are there to remind applicators that the container contents could make them sick or even kill them.

CORRECTION

Signal Word "WARNING" — The approximate amount of pesticide needed to kill the average person should read "a teaspoonful to two(2) tablespoonfuls."

Signal Word "CAUTION" — The approximate amount of pesticide needed to kill the average person should read "an ounce to a pint."

When Should a Pesticide Applicator Read the Label?

Before Buying the Pesticide to Determine:

- If it is the chemical needed for the job. Never purchase or select a pesticide based on the color of the label or product name. Labels of the same color and general makeup may contain widely different active ingredients.
- Whether the chemical is too toxic or hazardous to be used safely under the application conditions.
- The concentration in percent or pounds per gallon of active ingredient.
- If the formulation is suitable for the application equipment.

Before Preparing the Pesticide for Use to Determine:

- The recommended protective equipment to be used when handling it.
- The warnings and antidotes, when required.
- What can be mixed with it (compatibility).
- How much chemical to use.

Before Applying the Pesticide to Determine:

- The safety measures necessary for the applicator.
- To what the chemical can be applied.
- When to apply the chemical (including waiting period on crops and animals).
- How to apply the chemical.
- The rate of chemical application.
- Any restrictions for use of the chemical.
- Any other special instructions.

Before Storing or Disposing of the Pesticide and/or Pesticide Container to Determine:

- Where and how to store the chemical.
- Where the chemical should not be stored.
- What the chemical should not be stored with.
- How to decontaminate and dispose of the chemical container.
- Where to dispose of leftover chemicals or their containers.

Preventive Medicine and Pesticide Poisoning

Organophosphate pesticides are involved in more cases of occupational poisoning and death than any other single group of pesticide. Therefore, pesticide applicators using carbamate and organophosphate pesticides on a regular basis should consider having their blood tested to find their normal or base level of a chemical called cholinesterase. This chemical is necessary for the nervous system, and without it, the poison victim will die. Both carbamate and organophosphate pesticides attack this chemical in the blood and make it useless.

Once a pesticide applicator's base level of cholinesterase has been determined by a doctor, a simple blood test will show if he still has the normal amount. If not, the applicator has been overexposed to either an organophosphate or carbamate pesticide and should avoid further contact with these pesticides until the cholinesterase level has returned to normal. In severe cases, antidotes must be given. Pesticide applicators working with highly toxic carbamate and organophosphate pesticides should have their cholinesterase levels tested at regular intervals throughout the spray season.

Medical Antidotes for Pesticide Poisoning

By law, highly toxic pesticides must have instructions for the physician on the label in case of a pesticide poisoning; such instructions will include information on medical antidotes if such information is available. However, you should remember that medical antidotes can be very dangerous if misused. They should never be used as a preventive treatment and should be prescribed and given only by a qualified physician.

In cases where instructions for the physician are not given on the pesticide label, a Poison Control Center or Poison Treatment Center should be contacted (see pp. 5-10 and 5-11).

Universal Antidotes for Pesticide Poisoning

The best first aid is to dilute the poison as quickly as possible and to neutralize the acid or alkali causing the burns. It is very important that the victim get to a hospital without delay. The following are some universal antidotes for pesticide poisoning:

- For acids or alkali, give patient water or preferably milk. One to two cups for victims under 5 years of age, up to a quart for patients over 5 years of age. Milk is better than water because it dilutes and helps neutralize the poison. Water only dilutes the poison.
- For acids only: If you are sure that the poison is an acid, give the patient milk of magnesia (one tablespoon to one cup of water), baking soda or chalk in water.
- For alkali only: If you are sure that the poison is an alkali, give the patient lemon juice or vinegar.

Universal Sponge

"Universal sponges" should be used to absorb excess poisons only after first aid suggestions for the corrosive or noncorrosive poisons are followed. The following are two "universal sponges":

Activated charcoal absorbs many poisons at a high rate. Mix it with water into a thick soup for the victim to drink. Activated charcoal is found in aquarium filters or is available from a drug store.*

A homemade "universal sponge" for poison is a mixture of four tablespoons of toast (burnt black), two tablespoons of strong tea (instant ice tea mix will do), and two tablespoons of milk of magnesia. This is used to absorb and neutralize most poisons.

First-Aid Kit for Field and On-the-Job Use

A well-equipped, readily available first-aid kit can be important in a pesticide emergency. Make up your own Pesticide First-Aid Kit from a lunch pail, tool box or a sturdy wooden box. It should have a tight-fitting cover with a latch so that it won't come open or allow pesticides to leak inside. Label it clearly with paint or a waterproof marker.

*Grosafe— A commercial preparation of activated charcoal is sold for use on pesticide spills or overdoses on crops and soil. In a poisoning emergency, this product may be substituted for a pharmaceutical grade of activated charcoal and fed to the victim.

A first-aid kit for field and on-the-job use should include:

- —A small, plastic bottle of a common detergent. It is used to quickly wash pesticides off the skin.
- —A small, plastic container of salt. Salt is used with water to induce vomiting or to aid a person in shock.
- —A box or plastic container of baking soda or a bottle of milk of magnesia. These mixed with water will neutralize acidic chemicals that have been swallowed.
- —A plastic bottle of lemon juice or vinegar. These are used with water to neutralize basic or alkali chemicals which have been swallowed.
- —A small package or bag of activated charcoal. Mixed with water and swallowed, activated charcoal acts as an absorber of all pesticides.
- —A shaped plastic airway for mouth-to-mouth resuscitation.
- —A thermos or large plastic bottle (at least one pint capacity) of clean water. If there is no clean water in an emergency, use any pond or stream water available.
- —Simple band aids, bandages and tape. All cuts and scrapes should be covered to prevent pesticides from easily entering the body.
- —A blanket is very useful. It should be kept in a place where it will not be contaminated by pesticides.
- —A dime should always be taped to the inside cover of the first-aid kit. It is for an emergency phone call.
- —A small, plastic empty jar with a tight-fitting lid is useful as a drinking glass for the victim to induce vomiting or for feeding activated charcoal. It can also be used for collecting vomitus to take to the doctor.

Poison Control and Treatment Centers

Poison Information Centers and Poison Treatment Centers have been established in Iowa to give pertinent information on all types of poisonings including pesticide poisonings.

In contacting a Center, it is recommended that the contact be made by the victim's doctor to obtain the necessary information and save valuable time.

In addition to Centers in Iowa, information related to human poisoning *as well as animal poisoning* can be obtained from the Omaha Poison Control Center. The toll-free telephone number is: 1 (800) 288-9515.

Listed below are Centers where poison information is available and whose staff members are specially trained to treat human poisoning cases. The telephone numbers shown are general hospital listings, so *be sure* to specifically ask for the Poison Information Center or the Poison Treatment Center when making your call.

IOWA POISON INFORMATION CENTERS

1. Blank Memorial Hospital, 1200 Pleasant Street, Des Moines, Iowa 50308
   Mark Thoman, M.D., F.A.A.P., F.A.A.T., Executive Secretary — Phone (515) 283-6212
2. State University of Iowa Hospitals, Iowa City, Iowa 52240
   Robert Dick, R.Ph. — Phone (319) 356-1616
3. Trinity Regional Hospital, Fort Dodge, Iowa 50501
   Charles Dagle, M.D. and Robert E. Bellinger, R.Ph. — Phone (515) 573-3101

IOWA POISON TREATMENT CENTERS

City	County	Hospital	Telephone No.
Ames	Story	Mary Greeley Memorial	515-239-2011
Atlantic	Cass	Cass County Memorial	712-243-3250
Boone	Boone	Boone County	515-432-3140
Bloomfield	Davis	Davis County	515-664-2145
Burlington	Des Moines	Burlington Memorial	319-753-3011
Cedar Rapids	Linn	St. Luke's	319-398-7211
Cedar Rapids	Linn	Mercy	319-398-6011
Clarinda	Page	Clarinda Municipal	712-542-2176
Corydon	Wayne	Wayne County	515-872-2260
Council Bluffs	Pottawattamie	Jennie Edmundson	712-322-0231
Cresco	Howard	St. Joseph Mercy	319-547-2101
Creston	Union	Greater Community	515-782-7091
Davenport	Scott	St. Luke's	319-326-6512
Davenport	Scott	Davenport Osteopathic	319-391-2020
Davenport	Scott	Mercy	319-326-8511
Dubuque	Dubuque	Mercy Medical Center	319-588-8400
Eldora	Hardin	Eldora Community	515-858-5416
Emmetsburg	Palo Alto	Palo Alto County	712-852-2434
Harlan	Shelby	Myrtue Memorial	712-755-5161
Humboldt	Humboldt	Humboldt County Memorial	515-332-4200
Independence	Buchanan	Peoples' Memorial	319-334-2511
Iowa Falls	Hardin	Ellsworth Municipal	515-648-4631

City	County	Hospital	Telephone No.
Jefferson	Greene	Greene County Medical	515-386-2114
Keokuk	Lee	St. Joseph's	319-524-2710
Marshalltown	Marshall	Marshalltown Area Comm. East	515-752-4511
Mason City	Cerro Gordo	Mercy	515-423-1530
Muscatine	Muscatine	Muscatine General	319-263-4311
Newton	Jasper	Skiff Memorial	515-792-1273
Oelwein	Fayette	Mercy	319-283-2314
Onawa	Monona	Burgess Memorial	712-423-2311
Orange City	Sioux	Orange City Municipal	712-737-4984
Ottumwa	Wapello	Ottumwa	515-682-7511
Ottumwa	Wapello	St. Joseph Mercy	515-684-4651
Pocahontas	Pocahontas	Pocahontas Community	712-335-3501
Sac City	Sac	Loring	712-662-7105
Shenandoah	Page	Hand Community	712-246-1230
Sioux City	Woodbury	St. Luke's Medical Center	712-279-3500
Sioux City	Woodbury	St. Vincent's	712-279-2010
Sioux City	Woodbury	St. Joseph's Mercy	712-277-7000

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A Checklist for Preventing Pesticide Accidents

Every pesticide applicator can improve methods for safe handling of pesticides. Experienced pesticide applicators may become so familiar with the equipment and materials used that they become careless or take shortcuts. Then an accident can happen.

Yes	No	
		Store Your Pesticide Safely
☐	☐	Do you have a separate space to store pesticides?
☐	☐	Do you keep it locked, and are the windows tight, barred or boarded over?
☐	☐	Do you keep all your pesticides in this storage rather than in the garage, feed room, basement, porch, kitchen or refrigerator?
☐	☐	Do you store herbicides separately from other pesticides?
☐	☐	Are there signs on your storage so firemen and others are warned?
☐	☐	Do you check periodically for leaking containers?
		Keep in the Original Container So the Label Is There
☐	☐	Do you always keep pesticides in the original container instead of old soft drink bottles, milk cartons or other food containers?
☐	☐	When people ask you for a little spray mix out of your tank, do you always refuse?
☐	☐	Do you always remember what is in an unlabeled container?
☐	☐	Do you always remember the safety precautions, antidotes and directions for use, even though the container is not labeled?
☐	☐	Do you safely dispose of unlabeled pesticides, rather than take a chance with your memory?
		Use the Recommended Clothing and Protective Equipment
☐	☐	Do you read the label to see what protective clothing you should wear?
☐	☐	Do you start each spraying day with clean spray clothing?
☐	☐	Do you check the signal words and precautions for use on the label to see what protective equipment is necessary?
☐	☐	Do you wear the protective equipment recommended on the label?
☐	☐	Do you clean and maintain your protective equipment regularly and often?
☐	☐	Do you throw away rubber gloves that have only tiny holes in them?
		Spills and Splashes of Concentrates Can Be Very Hazardous
☐	☐	Do you know what to do if you should spill a pesticide on yourself while mixing?
☐	☐	Do you wear adequate footgear with your pant cuffs on the outside so pesticide won't run in to your footgear?
☐	☐	Do you have sawdust, vermiculite, kitty litter or some other absorbent on hand to soak up spills?
☐	☐	Do you always watch your sprayer tank when filling so it won't run over and spill on the ground?
☐	☐	Do you have a check valve or other device on your equipment to prevent back-siphoning into the water supply?
☐	☐	Is your application equipment well maintained so it doesn't leak and leave toxic puddles or piles of pesticide on the ground?
☐	☐	Do you avoid draining leftover spray mix on the ground?
☐	☐	Do you discard old, high-pressure hose instead of patching it and hoping no one will be nearby when it bursts?
☐	☐	Do you clean nozzles with a brush, by rinsing, etc., instead of blowing them out with your mouth?
		Poor Container Disposal May Cause Bad Accidents.
☐	☐	Do you rinse each "empty" liquid container at least three times and dump the rinsings into the tank?

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Yes	No	
☐	☐	Do you keep your used containers in your storage area until disposed?
☐	☐	Do you collect every container for disposal before leaving a job instead of leaving them in the field or at your tank filling station?
☐	☐	Do you puncture, break or crush nonburnable containers so they can't be reused?
☐	☐	Do you keep or return to the manufacturer 30- and 55-gallon pesticide drums, rather than giving them away for floats, trash barrels, etc.?

Attractive Nuisances Can Result in Lawsuits

☐	☐	Do you keep your spray equipment where children cannot play on it?
☐	☐	Do you keep your spray equipment clean so that those touching it will not be contaminated?
☐	☐	Do you always release pressure on your equipment so spray guns won't be accidentally triggered?

Care in Application Prevents Accidents

☐	☐	Do you check the wind direction and the area down wind before applying pesticides?
☐	☐	Do you consider substituting a safer chemical if you are spraying near a sensitive area?
☐	☐	Do you check for the possibility of showers and damaging runoff before applying pesticides?
☐	☐	Do you plan your pesticide application so it will have little or no effect on bees, birds, fish or other wildlife?
☐	☐	Do you remove, turn over or cover up pet dishes, sand boxes, plastic pools, etc. before spraying a private property?
☐	☐	Do you make sure that children and pets are out of the area and stay out until the spray dries?

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RECORDKEEPING

The Iowa Pesticide Act requires that commercial pesticide applicators maintain records of the pesticide applications they make for three years after the application; on each pesticide applied, these records must include (1) the name of the licensee, (2) the name of the landowner or customer, (3) an adequate and precise description of the land area involved in outdoor treatment and the exact address or location of any building(s) treated, (4) the date of application, (5) the pesticide product used, (6) the quantity of pesticide used and the rate of application, and (7) the direction and estimated velocity of the wind at the time of application to any outdoor area.

In addition to meeting the State of Iowa requirements of keeping application records for three years, keeping records of pesticide use is a wise precaution. Records can establish proof of proper use in damage suits, and can also provide information to trace residue or damage problems resulting in liability cases.

Records can also help pesticide applicators save money. They allow applicators to compare the results obtained from different pesticides. Applicators can improve their pest control practices and efficiency too. Records help to reduce pesticide misuse. Careful records from year to year help guide applicators in buying only the amounts of pesticides they will need. In this way, applicators can reduce winter carryover.

The more information that is on record, the more useful the records will be. Applicators should carry a notebook with them in the field. All the information is right there in front of them, but they should not try to memorize all the necessary items. They should fill in the recommended form to be sure they get all the necessary data every time.

On page 5-15 is a suggested spray record sheet for pesticide applicators.

SUGGESTED SPRAY RECORD SHEET

Licensee _____ Address _____ Phone _____

Customer _____ Address _____ Phone _____

Crop or other target treated _____

Number of acres or other units treated _____

Pest(s) controlled and developmental state _____

Severity of infestation, infection, etc. _____

Stage of crop growth (if applicable) _____

Date and time pesticide was applied _____

Soil condition (if applicable) _____
(wet, dry, cloddy, etc.)

Temperature _____ Humidity _____ Cloud Cover _____ Wind direction and speed _____

Pesticide used _____ EPA Reg. No. _____
(name of product and formulation)

How pesticide mixed (if applicable) _____
(active ingredient per gallon, etc.)

Application equipment used _____

Pesticide application rate _____
(active ingredient per acre or other unit treated)

Total amount of pesticide applied _____
(gallons or pounds per acre or other unit treated)

Specific location of application (if applicable): Twp _____ Sec. _____ 1/4 Sect. _____

Map of treated area (if applicable)

Additional comments _____

_____

_____

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Maintenance of Pesticide Application Equipment

Maintenance of Ground Sprayers

General. The following comments are based on the use of low pressure field sprayers. Maintenance for other sprayers, mist blowers or foggers would be similar, however.

Before spraying, the entire system should be rinsed out and the nozzles, nozzle screens and strainers removed and cleaned. If wettable powders will be used, strainers and nozzle screens should be 50 mesh or larger. In addition, nozzles should be all the same type and size and have the same fan angle. Nozzle caps should not be cracked or overtightened, especially if plastic. Lines, valves, seals and tank should be checked after filling with water and during running to determine that there are no leaks.

Nozzle height and spacing should be adjusted as suggested by the manufacturer and pesticide label and as required for crop or pest. If necessary, crop or weed height should be allowed for. If spraying the soil surface, a good check is to spray on a concrete or asphalt pavement and watch for streaks as the speed increases or as spray dries. Each nozzle should be checked for uniform flow using water and a jar marked in ounces. Any nozzles having flows 10 percent more or less than the average should be replaced. In addition, any nozzles having heavy or light streaks should also be replaced.

Tanks. After each pesticide use and at the end of each day, the tank, pump, lines and nozzles should be flushed out. When switching to another pesticide where contamination must be prevented, the tank should be washed out with detergent and water two or three times and then flushed with water. Phenoxy herbicides such as 2,4-D are hard to remove. After their use, the special cleaning procedures noted on the pesticide label should be followed or the same sprayer should not be used for any other product. The tank should be kept clean inside and out. All leaky tank seals or fittings should be tightened and repaired and sight gauges made readable.

Pumps. Pumps should not be operated dry or with a restricted inlet as pump damage will occur. They should not be stored with water in them but filled or coated with light oil instead. Mountings on tractor PTO shafts should be restrained from turning by chains or torque bars not bolted down. Pumps should not be operated at speeds or pressures higher than the manufacturer recommends, and all shields should be kept in place.

Hoses and fittings. Hoses should be kept from kinking or abrasion and should be rinsed often to prolong life. Hoses should be removed and stored during off-season, or at least the unit should be stored out of sun. For safety, hoses and fittings should be replaced at the first sign of deterioration because they are unsafe.

Pressure gauges. Pressure gauges should be checked frequently for accuracy against an accurate gauge to prevent overpressure. Glass faces should be kept clean and intact. If gauges fail to last, gauge protectors should be used to guard against corrosive pesticides and pressure surges.

Strainers. Clogged line strainers can cause undetected low pressure if boom pressure gauges are not used, and clogged nozzle screens can always cause such an effect. Strainers should be cleaned frequently and replaced if deterioration begins. Clean strainers are the best defense against nozzle and pump wear and nozzle clogging. Nozzle screens as large as nozzle sizes permit should be used, but the screen openings should be less than the nozzle openings.

Nozzles. The proper nozzle type and size should be selected for the pest control needed and pesticide used. Nozzles should be cleaned and unclogged only with an old toothbrush or toothpick, never with metal objects such as wires and knives. Nozzles should be removed for off-season storage and, when not in use, stored in unused oil or diesel fuel.

Maintenance of Granular Applicators

The day or job should be finished with each box almost empty. Equipment should be cleaned well at the end of each job as recommended by operator's manual.

Maintenance of Fumigators and Injectors

All units, especially pressurized ones, should be kept in good repair. Hoses and fittings should be replaced as soon as signs of deterioration occur. Lines and fittings should not be located near the operator. All precautions suggested by the fumigant label should be carefully observed. To avoid cross-contamination and corrosion, the units should be properly flushed after use, following directions on the label.

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Storage of Pesticide Application Equipment

All pesticide application equipment should be stored in a special area. Often this equipment is contaminated with pesticides. Children or other unauthorized people should not be allowed to play on or around the machines because they could pick up a harmful dose of pesticide. All pesticide equipment should be washed carefully before it is stored. Often, steam cleaning of equipment may be necessary; in other situations, hot water and soap may be adequate.

A specific area for use during cleaning operations should be designated. Preferably, the area should have a wash rack or cement apron that has a well-designed sump to catch all contaminated wash water and pesticides.

The outside of equipment should be thoroughly rinsed off while it is parked in the special wash area. Rinse water should not be allowed to get on the ground and into streams, ponds or other sensitive areas. All movable pesticide equipment should have a sign: "Danger...Pesticides" to warn people to stay away. Delivery trucks, nurse tanks and other support equipment also should be rinsed thoroughly and stored. Before storage at the end of a season and after rinsing as suggested in the General Section, the tank should be almost refilled with clean water. Then one or two gallons of new light oil should be added to the tank. Next, the tank contents should be pumped out through the nozzles and handgun, if present, thus coating the system. The pump should then be drained and its openings plugged. Finally, nozzles and nozzle screens should be removed and stored in oil.

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Iowa Pesticide Act

The Iowa Pesticide Act as amended by the 65th General Assembly regulates pesticides through two approaches: (1) by requiring the registration of all pesticide products sold in Iowa; and, (2) by requiring that individual pesticide applicators be certified as competent to apply pesticides. The Act also provides that the state may develop standards for certification. In addition to the certification of applicators, all persons (companies) engaged in the business of applying pesticides must be licensed by the Iowa Department of Agriculture and the individual pesticide applicators who apply pesticides and are not under the direct supervision of a certified pesticide applicator must be certified.

The Department of Agriculture's method of certification will be to require the passing of written examinations. Applicators will be classified into certification classifications according to pesticide usage, and a separate written examination will be given for each classification.

Commercial pesticide applicators are required to maintain records of the pesticide applications they make for three years after the application. In addition, pesticide dealers distributing restricted use pesticides will be required to be licensed in 1976.

Other features of the Iowa Pesticide Act are that a number of misuses of pesticides have now become legal violations. One of the most important misuses is using a pesticide in a manner not in general conformity with the label. Licensed or certified pesticide applicators could have their licenses or certifications revoked, suspended or denied as a result of any violation of the Act.

The amendments of the Iowa Pesticide Act expanded the authority of seizures to include the issuance of written stop sale, stop use and removal orders. The department has authority to investigate pesticide accidents, incidents or loss arising from the use or misuse of pesticides, and the finding of these investigations may be made available to the person claiming damage and to the person who is alleged to have caused the damage.

Public Law 92-500

Public Law 92-500 requires immediate notification of the appropriate agency of the U. S. Government of discharge of oil or hazardous substances. Any such person who fails to notify immediately such agency of such discharge shall, upon conviction, be fined not more than $10,000 or imprisoned for not more than one year, or both. All major pesticide spills should be immediately reported to the Environmental Protection Agency. The telephone number to call in the four-state area of Iowa, Missouri, Kansas and Nebraska is (816) 374-3778. The following information should be reported:

- Name, address and telephone number of persons reporting
- Exact location of spill
- Name of company involved and location
- Specific pesticide spilled
- Estimated quantity of pesticide spilled
- Source of spill
- Cause of spill
- Name of body of water involved, or nearest body of water to the spill area
- Action taken for containment and cleanup

Suggested Actions

All major pesticide spills in Iowa should be reported by telephone to the Iowa Department of Environmental Quality (515) 288-6819; depending on the nature and location of the spill, it may also be appropriate to notify other authorities.

In addition, since at the present time Iowa does not have appropriate incinerators or landfills, surplus pesticide should be either temporarily stored or the Iowa Department of Environmental Quality should be contacted in order to work out safe disposal alternatives. The DEQ telephone number is (515) 265-8134.

LIABILITY

Almost all pesticides are considered hazardous. Even the most careful applicators sometimes have claims for damages against them. The usual claims are for nonperformance or for injury to crops being treated or to crops in nearby fields. It is important for all pesticide applicators to be informed of the most common claims made against them.

It is primarily important to remember that applicators will be breaking the law any time they do not follow any of the directions on a pesticide label. As the section on Laws and Regulations explained, they may receive a civil penalty of up to $5,000 even though they did not intend to break the law. Anyone who knowingly misuses a pesticide is guilty of a criminal offense and, upon conviction, could be fined up to $25,000 and imprisoned for up to one year.

Potential Problem Areas

Drift

Drifting pesticides are a major cause of environmental contamination and damage to nontarget areas. In general, the courts have held the applicator and the grower who hired the applicator jointly liable in drift cases. The grower is reponsible when hiring or contracting for a "particularly dangerous operation" such as the application of pesticides. However, the applicator should not depend on the grower to share costs. The grower may file another suit against the applicator claiming that the applicator agreed not to cause drift damage. The manufacturer of the pesticide may be held liable in drift cases if the label doesn't clearly warn about the possibility of drift.

Crop Injury

Claims of injury to the crop that was treated or claims that the pesticide had not performed as expected involve the dealer, the manufacturer, and the applicator. The courts must decide which of the three recommended or guaranteed the product for that specific use on that crop. The party in error must accept the blame and pay damages. Applicators must make sure that all the pesticides they use are recommended on the label for that purpose. Then, the blame may be the manufacturer's.

If the crop injury was not excessive or total, the grower must show how much damage was due to the pesticide and how much was due to other conditions such as weather, disease, insects, etc. This breakdown is not necessary in cases wth excessive or total injury.

Personal Injury

Application of pesticides is considered an especially dangerous or, in legal terms, an "ultrahazardous" activity. As a result, the pesticide applicator is liable for any injury to a person from the pesticide. Usually, the injured person can recover damages without proving negligence on the part of the applicator. The injured party must only prove that he or she is free of any negligence and did not assume the risk of pesticide exposure. Pest control operators or exterminators are sometimes a special case. The liability in most such cases involving personal injury or death depends on proving the applicator negligent.

Wrong Field

If the pesticide is applied on a field, crop or area other than the one for which it was intended, serious problems can result. In the event that damage or excessive residues are the result or simply that the owner didn't want the area treated, the applicator may be charged with trespass. Defense in a case like that is very difficult. An applicator should double check on addresses, field locations and all landmarks before treating an area. In addition, aerial applicators should always use ground flaggers. Applying pesticides to the wrong field can be costly.

Bees

Honeybees are very important to farmers, and they often have their own colonies or hives. Bees are very susceptible to many pesticides, particularly insecticides. If the bees in hives are killed as the result of drift from nearby fields, the applicator is usually held legally responsible. Often the applicator must pay damages.

However, if the bees contacted the pesticides while in the sprayed fields, the applicator is not usually liable. The courts have ruled that the bee is trespassing, and that the land doesn't need to be safe to uninvited animals. However, applicators should play it safe. They should know where the beehives are located in the area and warn the beekeeper beforehand when and where they will be spraying.

Attractive Nuisance.

The rulings on "attractive nuisance" usually in-

volve cases when children are attracted to ground equipment or aircraft and injure themselves. When this happens, the owner and/or applicator are held liable for leaving the "nuisance" where a child could be attracted to it.

Therefore, an applicator should play it safe and should not leave ground equipment with exposed drive belts, drive wheels, gears or any moving parts alone in areas where children can get to them. Aircraft should never be parked where curious children can investigate them. Empty containers and aerosol cans are also attractive and dangerous to children. An applicator should store or dispose of empty containers and aerosol cans properly.

Noise

Recently, claims have been brought against applicators for noise damage. Owners of mink, poultry, turkey and occasionally cattle ranches claim injury to their animals from fright caused by noise of aircraft and ground equipment operating above or near their ranch.

However, such an owner must prove direct loss of property due to noise from machinery operated carelessly or negligently. In some cases, the ranchowner will claim that an applicator made an unlawful flight over property without permission. This is especially important in aerial applications when pullups over nearby property are necessary. Successful defense is possible when the applicator can show that the noise wasn't the cause of injury or that no injury occurred.

Cross Contamination

Every year there are cases where a pesticide container has in it not only the pesticide named on the label but another pesticide also. When this happens, the materials in the container may damage the crops being treated. There are three main ways this may occur:

- —The manufacturer may make a mistake in labeling or formulating the product.
- —The applicator may err in mixing or filling in the spray tank, or may not have removed from the tank all the pesticide left over from the last application.
- —Open containers of herbicides such as 2,4-D can vaporize and penetrate other pesticides which are stored nearby. When the other pesticides are applied, the 2,4-D contamination can seriously injure the crops.

The applicator must know which container of pesticide was used on the crop so that laboratory tests can be made. The lab tests can show whether the contamination occurred during mixing and filling or earlier. In cases involving herbicide contamination, it is difficult to prove whether it is the result of vaporization during storage or manufacturer formulation error. The courts must decide who is to blame.

All applicators should write on the label of each pesticide container the location and the date it was applied. They should also record the lot number in case of cross contamination.

What Applicators Should Do When Involved

If applicators become involved in any legal problem, they should act carefully and promptly. They should always be friendly and helpful, but never admit liability. They should be careful to whom they give information about their spray operation, but should offer to look into the matter at once. Applicators should:

- —examine records to make sure that they were actually operating in the area at the time of the alleged injury.
- —make sure that all records are up-to-date, particularly as to the identity of the equipment used, temperatures, wind direction and velocity, and all other pertinent data.
- —proceed to the scene immediately and make notes of all essential information at the location.
- —record the presence of any adverse conditions observed at the time of investigation, particularly insect infestation, disease, water stress, late planting, carry-over effect from other materials or herbicides and age of crop.
- —photograph with color film any adverse conditions found at a sufficiently close focal length so that the symptoms can be examined by an expert.
- —save the container which held the product used on the job. If it is not practical to save the whole container, the applicator should use close-up color photography to record the label.
- —notify the insurance company immediately.
- —have an expert examine the crop or the property so that the applicator may have the benefit of an expert's opinions.
- —notify the chemical company involved immediately. They will probably want to send their experts to the site.
- —obtain the names and addresses of all witnesses who might testify as to the nature of

the operation and the conditions of the crop before and after. In the event that the crop is perennial, examine USDA aerial photographs to ascertain the condition of the orchard or other planting prior to the year of alleged injury.

Insurance

To protect self and business, a pesticide applicator should have insurance for possible pesticide mishaps. There are many different types of insurance plans ranging from bodily injury, property damage, restricted chemical liability and comprehensive chemical. The plan chosen should fit an applicator's needs and business. If an applicator has a relatively low risk position from a legal standpoint (such as a golf course superintendent), then minimum coverage may be enough. In Iowa, if a commercial pesticide applicator chooses to prove financial responsibility in the form of a certificate of liability insurance, the minimum amount of liability coverage acceptable is $50,000 each for property damage and public liability insurance, including loss for damage arising out of actual use of any pesticide (chemical coverage). An applicator should be sure to explore the costs, benefits and drawbacks of insurance before buying and needs to know exactly what the insurance covers. An insurance agent who specializes in pesticide insurance is the best person to advise an applicator on individual insurance needs.

QUESTIONS FOR SELF-STUDY

On an *actual* certification examination, there will be 75 questions on the material presented in the EPA-USDA commercial applicator manual (plus supplement) and 25 questions on the material presented in the applicable category manual. If you wish to become certified in more than one category, you would take, and pass, the 75-question, EPA-USDA manual test only once and then take as many applicable category manual tests as you wish.

All of the certification questions use a multiple-choice format with five possible answers; *there is only one correct answer to each question.*

The following sample questions are designed to give you an idea of the types of questions that will be on a certification examination. They are typical of the questions that you will encounter when taking the EPA-USDA manual portion of a certification examination. The correct answers to the sample questions may be found on page 8-3.

1. The first step in solving any pest control problem is to:
   a. purchase the pesticide.
   b. establish the fee.
   c. identify the specific pest(s) causing the problem.
   d. check the pesticide safety equipment.
   e. read the laws regulating pesticide use.

2. All adult insects have:
   a. chewing mouthparts.
   b. two body regions.
   c. wings.
   d. three body regions.
   e. eight jointed legs.

3. Using parasites and predators to control pests is referred to as _____ _____ control.
   a. mechanical-physical
   b. cultural
   c. legal
   d. integrated
   e. biological

4. The word pesticide refers to:
   a. insecticides.
   b. herbicides.
   c. fungicides.
   d. rodenticides.
   e. All of the above apply.

5. Atrazine is an example of a pesticide made from:
   a. minerals.
   b. plants.
   c. synthetic, organic materials.
   d. living organism.
   e. None of the above apply.

6. Postemergence pesticides should be used:
   a. before the crop or weeds have emerged.
   b. after the crop has emerged but before the weeds have emerged.
   c. before the crop is planted.
   d. after the crop or weeds have emerged.
   e. None of the above apply.

7. Most LD_{50} values are given on a basis of:
   a. milligrams of pesticide per kilogram of body weight of test animal.
   b. ounces of pesticide per 100 pounds of body weight of test animal.
   c. milligrams of pesticide per 100 pounds of body weight of test animals.
   d. ounces of pesticide per kilogram of body weight of test animal.
   e. None of the above apply.

8. A pesticide with an LD_{50} value of 2,000 would always be _____ than a pesticide with an LD_{50} value of 50.
   a. more concentrated.
   b. more toxic.
   c. longer lasting.
   d. more hazardous.
   e. less toxic.

9. An LD_{50} value given on a basis of milligrams of pesticide per kilogram of body weight of test animal can be converted to ounces per 100 pounds by dividing it by:
   a. 100
   b. 625
   c. 1,000
   d. 1,375
   e. 500

10. If a pesticide has an oral LD_{50} (mg/kg) of 1375, what is the probable lethal (deadly) oral dose for a 200-pound man?
    a. 1.1 ounces
    b. 2.2 ounces
    c. 3.3 ounces
    d. 4.4 ounces
    e. 5.5 ounces

11. If a pesticide label has the signal word "Danger" on it, the pesticide is:
    a. highly toxic.
    b. moderately toxic.
    c. slightly toxic.
    d. relatively nontoxic.
    e. None of the above apply.

12. Most accidental pesticide deaths are caused by people:
    a. absorbing the pesticide through their skin.
    b. eating or drinking the pesticide product.
    c. being contaminated by pesticide drift.
    d. eating food containing illegally high pesticide residues.
    e. being poisoned while working in pesticide manufacturing plants.

13. One of the first symptoms of mild organophosphate pesticide poisoning is:
    a. inability to walk.
    b. muscle twitching.
    c. blurred vision.
    d. severe constriction of pupil of the eye.
    e. breathing difficulty.

14. Water-wettable powders and suspensions can be most easily removed from the skin with:
    a. paint thinner.
    b. plain water.
    c. isopropyl alcohol.
    d. liquid detergent.
    e. vinegar.

15. When using pesticides that enter the body quite rapidly through the skin, a pesticide applicator should:
    a. make sure that the pesticide has a low oral LD_{50} (mg/kg) value.
    b. notify the Iowa Department of Health.
    c. wear protective clothing and devices.
    d. make sure that the pesticide has a high oral LD_{50} (mg/kg) value.
    e. only use the pesticide in a bait formulation.

16. A pesticide storage area should:
    a. not be locked.
    b. be dry and cool.
    c. not be ventilated.
    d. admit direct sunlight.
    e. have a wooden floor.

17. Empty pesticide containers should be rinsed at least _____ times with the same liquid with which the spray tank is being filled.
    a. 2
    b. 5
    c. 4
    d. 3
    e. 6

18. In cleaning up liquid pesticide spills, the first thing to do is:
    a. hose down the contaminated area with water.
    b. try to get the material back into the container.
    c. hose down the contaminated area with soap and water.
    d. stop the chemical action of the pesticide with common household bleach or a solution of lye or ammonia.
    e. soak up the spill with an absorbent material.

19. Generally, spray delivery can be increased the most by:
    a. increasing sprayer pressure and increasing ground speed.
    b. decreasing sprayer pressure and increasing ground speed.
    c. increasing sprayer pressure and decreasing ground speed.
    d. decreasing sprayer pressure and decreasing ground speed.
    e. decreasing spray pressure and leaving ground speed constant.

20. Sprayers that have contained a phenoxy herbicide such as 2,4-D can be cleaned out best by:
    a. simply flushing them with water.
    b. flushing them with isopropyl alcohol.
    c. running an emulsifiable concentrate insecticide through them.
    d. running a nonphenoxy herbicide through them.
    e. following the special cleaning procedures on the pesticide label.

21. For commercial pesticide applicators to knowingly violate the Federal Environmental Pesticide Control Act is a criminal offense and carries a fine up to:
    a. $1,000
    b. $5,000
    c. $25,000
    d. $50,000
    e. $100,000

22. Safe reentry periods are established to allow pesticide residues to:
    a. break down to low levels or disappear completely.
    b. become synergistic.

c. become compatible.
d. reach moderately toxic levels.
e. reach the target pest.

23. Keeping pesticide application records:
    a. is not actually required by the Iowa Pesticide Act for commercial applicators.
    b. can reduce winter carryover.
    c. can provide information to trace residue or damage problems resulting in liability cases.
    d. Only a and b above apply.
    e. Only b and c above apply.

24. If pesticide applicators have surplus pesticide that they wish to dispose of, they should contact the:
    a. Extension Service.
    b. Iowa Department of Agriculture.
    c. Iowa Department of Environmental Quality.
    d. Environmental Protection Agency.
    e. Iowa Department of Water Quality.

25. Claims of injury to a crop that was treated with a registered pesticide or claims that the registered pesticide did not perform as expected involve the:
    a. pesticide dealer.
    b. pesticide applicator.
    c. pesticide manufacturer.
    d. All of the above apply.
    e. Only b and c above apply.

Correct Answers

1. c	6. d	11. a	16. b	21. c
2. d	7. a	12. b	17. d	22. a
3. e	8. e	13. c	18. e	23. e
4. e	9. b	14. b	19. c	24. c
5. c	10. d	15. c	20. e	25. d

AND JUSTICE FOR ALL

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Cooperative Extension Service, Iowa State University of Science and Technology and the United States Department of Agriculture cooperating. Charles E. Donhowe, director, Ames, Iowa. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

Cooperative Extension Service, ISU, supplement to USDA-EPA manual **Apply Pesticides Correctly— A guide for commercial applicators.**